Chapter 17: Community Resilience Metrics

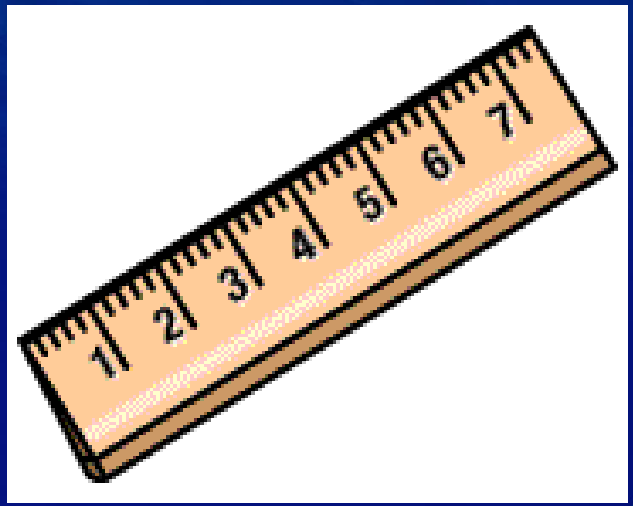
Presenter:

Frank Lavelle
Applied Research Associates, Inc.

Community Resilience Metrics

Metrics are needed…

- To understand the current situation
- To assess planning options
- For transparency in decision-making
- To evaluate progress



Focus on the Built Environment

Metrics are needed to assess expected benefits of planning decisions regarding the built environment:

- Siting, Design, Construction
- Operation, Maintenance, Protection
- Repair and Restoration

Four Main Types

1. Recovery times
2. Economic vitality
3. Social well-being
4. Environmental resilience

Plus others (hybrid metrics & system-specific metrics)

Many Options Exist

- Many individual metrics or indicators have been proposed in the open literature
- Several examples of each main type are reviewed in Section 17.3 of the Guide

- Many methodologies for combining metrics and assessing community-level resilience have been proposed in the open literature
- Several examples in Section 17.4 of the Guide

Examples of Existing Methodologies

- SPUR (San Francisco) Methodology
- Oregon Resilience Plan
- UNISDR Disaster Resilience Scorecard
- CARRI Community Resilience System
- Communities Advancing Resilience Toolkit
- Baseline Resilience Indicators for Communities
- Rockefeller City Resilience Framework
- NOAA Coastal Resilience Index
- FEMA Hazus Methodology

Preliminary Assessment

		Existing Assessment Methodologies								
Category	**Sub-Category**	**SPUR**	**Oregon**	**Scorecard**	**CARRI CRS**	**CART**	**BRIC**	**CRF**	**CRI**	**Hazus**
Scope	Community size	•	•	+	+	+	+	+	•	+
	Hazards	•	•	+	+	+	+	+	-	-
	Recovery time scales	+	+	?	?	?	?	+	•	-
	Systems	+	+	?	+	-	-	+	•	•
	Interdependencies	•	•	?	+?	-	-	+?	-	-
Utility	User friendliness	•	•	+	+	+	+	•	+	•
	Utility without SMEs available	-	-	+	•?	•?	•?	•	•?	•?
	Value of outputs for planning	+	+	•	?	?	?	+?	•	•?
	Consistency with PPD-21	+	+	•	+	+	•	•	•	-
Impacts Assessed	Recovery times	+	+	•	•	•	•	•	•	•
	Economic impacts	•	+?	•	•	•	•	+?	-	•
	Social impacts	•	•	•	•	•	•	+?	•	•
Techniques Used	Checklists	-	-	Y	Y	Y	-	Y	Y	O
	Interviews, Surveys	-	-	-	O	Y	-	Y	O	O
	Ratings	Y	Y	Y	O	Y	-	Y	O	Y
	Existing national data sets	-	-	-	-	-	Y	-	-	Y
	Physical inspections	O	O	O	O	-	-	-	O	O
	Engrg. analysis or expert opinion	Y	Y	O	O	-	-	-	O	Y
	Statistical inference	O	O	-	O	-	-	-	-	Y
	Simulations	O	O	-	O	-	-	-	-	Y

Symbol	Description
+	Addresses a broad range
•	Not inherently limited
-	Limitation
?	Additional info. required

Symbol	Description
+	High
•	Moderate
-	Low
?	Additional info. required

Symbol	Description
+	Explicitly assessed
•	Partially/indirectly assessed
-	Not assessed
?	Additional info. required

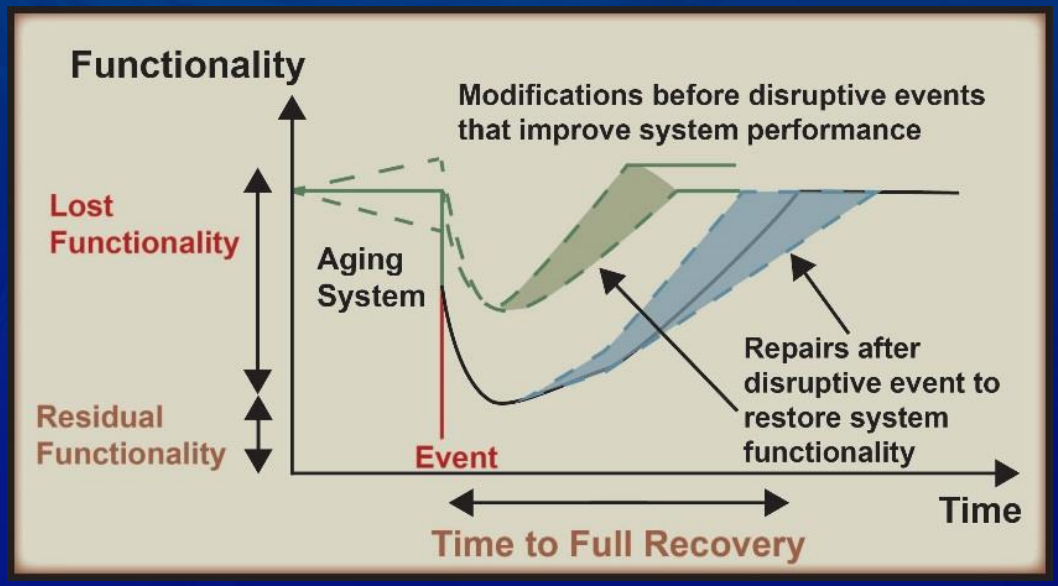
Symbol	Description
Y	Yes
o	Optional

No “One Size Fits All” Solution

- Each methodology has strengths
- Best metrics and most appropriate weightings will likely vary from one community to the next
- This is an ongoing and active area of research, development and evaluation

Guide Focuses on Recovery Times

- Easy to understand and communicate
- Can be developed through expert judgment or detailed system-of-systems modeling
- Recovery times are a pre-requisite for nearly all other metrics



Source: McAllister (2013)